REBECO CHEMICALS

915/381-2595

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STABILITY INDEX (STIFF-DAVIS METHOD)

for $CaCO_3$

$SI = pH - pCA - pALK - K$

pH = 7.25
pCa = 1.48
pALK = 1.98
K @ 80°F = 2.95
@ 100°F = 2.73
@ 120°F = 2.45

where:

pH	=	Lab measured (pH meter).
pCa	=	Negative logarithm of Calcium ion concentration.
pALK	=	Negative logarithm of Alkalinity of Bicarbonate ion.
K	=	Constant representing the effects of temperature and total salt concentration of $CaCO_3$.
SI	=	The stability index for Calcium Carbonate. A positive index indicates deposition (scale) will occur. A negative index indicates a corrosive condition. An SI of zero indicates water is in equilibrium, neither corrosive nor scale forming.

IONIC STRENGTH TO DETERMINE K VALUE

Ion	Ionic Mg/L	Mg/L times 10^{-6}	Factor	Ionic Strength
Na	118,122	.118	2.2	.2596
Ca	2,300	.023	5.0	.115
Mg	1,037	.01	8.2	.082
Cl	187,000	1.87	1.4	2.618
HCO_3	634	.006	.8	.0048
SO_4	2,800	.028	2.1	.0588
		Total Ionic Strength =		3.1334

Remarks:

SI @ 80°F = 7.25 - 1.48 - 1.98 - 2.95 = + .84

SI @ 100°F = 7.25 - 1.48 - 1.98 - 2.73 = +1.06

SI @ 120°F = 7.25 - 1.48 - 1.98 - 2.45 = +1.34

Stability Index indicates $CaCO_3$ scaling at temperatures above 60°F.

REPRESENTATIVE

Chemicals for the Petroleum Industry

$CaSO_4$ (Gyp)

Scaling Tendency

$$SO_4^{--} = \frac{Ksp \times F_1 \times F_2}{Ca^{++}} = \text{Saturation in meq/l @ } 90^oF$$

$$SO_4^{--} = \frac{964 \times 2.97 \times 1.72}{115} = 42.82 \text{ meq/l}$$

Calculated Saturation = 42.82 meq/l

Analysis is 58.33 meq/l

o°o $CaSO_4$ scale is indicated.